

**CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE**

Directorate General of Training (DGT)  
Government of India, Ministry of Skill Development and Entrepreneurship,  
Shram Shakti Bhavan, Rafi Marg  
New Delhi-110001

**Name and address of submitting body:**

Directorate General of Training (DGT)  
Government of India, Ministry of Skill Development and Entrepreneurship,  
Shram Shakti Bhavan, Rafi Marg  
New Delhi-110001

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**List of documents submitted in support of the Qualifications File**

1. Competency-based curriculum (Annexure 1)
2. Advertisements of different organisations for posts relevant to NTC in the trade
3. Placement figures of few ITIs

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) –

REVISED

#### SUMMARY

<b>Qualification Title</b>	'Tool & Die Maker ( Press Tools, Jigs & Fixtures)'																																
<b>Qualification Code</b>	N/A																																
<b>Nature and purpose of the qualification</b>	National Trade Certificate; to train the 10 <sup>th</sup> class pass students in 'Tool & Die Maker ( Press Tools, Jigs & Fixtures)' trade and thus changing a non-worker to worker																																
<b>Body/bodies which will award the qualification</b>	National Council for Vocational Training (NCVT)																																
<b>Body which will accredit providers to offer courses leading to the qualification</b>	<b>National Council for Vocational Training (NCVT)</b> affiliates the ITIs on the basis of accreditation by Quality Council of India (QCI).																																
<b>Body/bodies which will carry out assessment of learners</b>	National Council for Vocational Training (NCVT)																																
<b>Occupation(s) to which the qualification gives access</b>	<p>On successful completion of this course, the candidates shall be gainfully employed as:</p> <ul style="list-style-type: none"> <li>• Tool maker and repairer of prototypes or special tools, Press Tools maker, Press Tools setter, Jigs &amp; Fixtures maker, various types of mechanical devices maker, fabricator of various parts, fitter in industries of Production &amp; Manufacturing, Automobile Manufacturing and Assembling sector, Industries engaged in Automation Processes.</li> <li>• Tool &amp; Die Maker (Press Tools, Jigs &amp; Fixtures) have a wide scope of Employability ranging from self-employment to Industrial jobs.</li> </ul>																																
<b>Licensing requirements</b>	N/A																																
<b>Level of the qualification in the NSQF</b>	Level 5																																
<b>Anticipated volume of training/learning required to complete the qualification</b>	<table border="1"> <thead> <tr> <th>S. No.</th> <th>Course Element</th> <th>Notional Training Hours</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Professional Skill (Trade Practical)</td> <td>2209</td> </tr> <tr> <td>2</td> <td>Professional Knowledge (Trade Theory)</td> <td>510</td> </tr> <tr> <td>3</td> <td>Workshop Calculation &amp; Science</td> <td>170</td> </tr> <tr> <td>4</td> <td>Engineering Drawing</td> <td>255</td> </tr> <tr> <td>5</td> <td>Employability Skills</td> <td>110</td> </tr> <tr> <td>6</td> <td>Library &amp; Extracurricular activities</td> <td>146</td> </tr> <tr> <td>7</td> <td>Project work</td> <td>240</td> </tr> <tr> <td>8</td> <td>Revision &amp; Examination</td> <td>520</td> </tr> <tr> <td></td> <td><b>Total</b></td> <td><b>4160*</b></td> </tr> </tbody> </table> <p>The major change is the addition of revision component approximately 360 hours; hence there is increase in the total no of notional hours.</p>			S. No.	Course Element	Notional Training Hours	1	Professional Skill (Trade Practical)	2209	2	Professional Knowledge (Trade Theory)	510	3	Workshop Calculation & Science	170	4	Engineering Drawing	255	5	Employability Skills	110	6	Library & Extracurricular activities	146	7	Project work	240	8	Revision & Examination	520		<b>Total</b>	<b>4160*</b>
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	<b>Total</b>	<b>4160*</b>																															
<b>Entry requirements and/or recommendations</b>	Passed 10th Class with Science and Mathematics under 10+2 system of Education or its equivalent																																

<p><b>Progression from the qualification</b></p>	<ul style="list-style-type: none"> <li>• Can appear in 10+2 examination through National Institute of Open Schooling (NIOS) for acquiring higher secondary certificate and can go further for General/ Technical education</li> <li>• Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC)</li> <li>• Can join Crafts Instructor Training Scheme (CITS) in the relevant trade after which they will be employed in ITI/ Vocational Training Institute as instructor</li> <li>• Can take admission in diploma course in notified branches of Engineering by lateral entry</li> <li>• Can join as skilled worker in the relevant industry</li> <li>• can become supervisor after doing diploma in relevant branch of Engineering</li> </ul>		
<p><b>Planned arrangements for the Recognition of Prior learning (RPL)</b></p>	<ol style="list-style-type: none"> <li>1. At present the students who have passed 10th class with minimum 3 years' experience in relevant field can appear for NCVT theory and practical semester examination directly.</li> <li>2. The students who have passed SCVT examination in 'Tool &amp; Die Maker (Press Tools, Jigs &amp; Fixtures)' trade can also appear for the NCVT Examination in the relevant semester and Trade directly.</li> </ol>		
<p><b>International comparability where known</b></p>	<ol style="list-style-type: none"> <li>1. Comparison Made with German Syllabus and the proposed syllabus is in line with the existing German Syllabus (Around 95% contents are matching).</li> <li>2. However, ITI passed out trainees are getting employment in many Gulf countries and abroad.</li> </ol>		
<p><b>Date of planned review of the qualification.</b></p>	<p>January 2023</p>		
<p><b>Formal structure of the qualification</b></p>			
<p><b>Title of component and identification code.</b></p>	<p><b>Mandatory/ Optional</b></p>	<p><b>Estimated size (learning hours)</b></p>	<p><b>Level</b></p>

# NSQF QUALIFICATION FILE

## Tool & Die Maker (Press Tools, Jigs & Fixtures) –

REVISED

<b>Semester – I</b>				
(i)	Plan and organize the work to make job as per specification applying different types of basic fitting operation and Check for dimensional accuracy. [Basic fitting operation – Filing, Marking, Hack sawing, Drilling, Taping, chipping and Grinding etc. Accuracy: $\pm 0.1\text{mm}$ ]	Mandatory	320	5
(ii)	Make different fit of components for assembling as per required tolerance observing principle of interchange ability and check for functionality. [Different Fit–Open, Angular, & Square Fit; Required tolerance: $\pm 0.05\text{ mm}$ , angular tolerance: 1 degree.]	Mandatory	200	5
(iii)	Set different shaped jobs on different chuck and demonstrate conventional lathe machine operation observing standard operation practice. [Different chucks:3 jaws & 4 jaws, different shaped jobs: round, square, hexagonal]	Mandatory	40	4
(iv)	Prepare different cutting tool to produce jobs to appropriate accuracy by performing different turning operations. [Different cutting tool – V tool, side cutting, parting, thread cutting (both LH & RH),appropriate accuracy: $\pm 0.06\text{mm}$ , Different turning operation – Plain, facing, drilling, boring (counter & stepped), grooving, Parallel Turning, Step Turning, parting, chamfering, U-cut, Reaming, internal recess, knurling.	Mandatory	200	4
(v)	Set the different machining parameters to produce threaded components applying method/ technique and test for proper assembly of the components with an accuracy of $\pm 0.05\text{ mm}$ . [Different threads viz., metric/ BSW/ Square]	Mandatory	40	4
		Mandatory	240	5
<b>Semester – II</b>				
(vi)	Set the different machining parameters and cutters to prepare job by performing different milling operation and indexing. [Different machining parameters – feed, speed and depth of cut. Different milling operations – plain, stepped, angular, dovetail, T-slot, contour, gear milling]	Mandatory	240	5
		Mandatory	180	5
(vii)	Produce components of high accuracy by surface grinding operation. [Accuracy of $\pm 0.02\text{ mm}$ ]	Mandatory	40	4
(viii)	Produce components of high accuracy by cylindrical grinding operations. [Accuracy of $\pm 0.02\text{mm}$ .]			
(ix)	Sharpen different cutter or multipoint cutting tool. [Different cutters – end mill cutter, side & face milling cutter, single angle cutter, Reamer]	Mandatory	160	5
(x)	Develop isometric drawing and solid modelling of mould using CAD & Pro-E.	Mandatory	80	5
(xi)	Set the welding plant with appropriate parameters & perform different welding operations. [Appropriate parameter-	Mandatory	120	5

# NSQF QUALIFICATION FILE

## Tool & Die Maker (Press Tools, Jigs & Fixtures) –

REVISED

	electrode size, voltage, current, position, travel speed, torch angle.]			
<b>Semester – III</b>				
(xii)	Manufacturing of drill Jig and produce component on drill machine by using Jigs and check for correctness. (Simple template & Plate Jig)	Mandatory	120	5
(xiii)	Manufacturing of fixtures (milling, turning and grinding) & test.	Mandatory	240	5
(xiv)	Set (both job and tool) CNC turning centre and produce components as per drawing by preparing part programme.	Mandatory	80	5
(xv)	Set (both job and tool) CNC machining centre vertical and produce components as per drawing by preparing part programme.	Mandatory	80	4
(xvi)	Perform 2D & 3D machining with CAM software.	Mandatory	120	4
(xvii)	Produce components using Electric Discharge Machine (EDM) and Wire EDM as per drawing by preparing part programme with accuracy of $\pm 0.02\text{mm}$ .	Mandatory	80	5
(xviii)	Manufacturing of blanking (simple) die set for square/ round/ rectangular/elliptical component and verify the component.	Mandatory	80	5
(xix)	Construct a Piercing & Blanking tool & test and verify the component.	Mandatory	80	5
<b>Semester – IV</b>				
(xx)	Construct circuit of pneumatics and hydraulics observing standard operating procedure and safety aspect.	Mandatory	120	5
(xxi)	Demonstrate function of basic electrical circuit and sensors.	Mandatory	80	5
(xxii)	Construct a Compound Tool & test and verify the component.	Mandatory	120	5
(xxiii)	Construct a Progressive tool & test and verify the component.	Mandatory	120	5
(xxiv)	Plan and perform simple repair, overhauling of different machines and check for functionality. [Different Machines – Drilling Machine, milling machine and Lathe]	Mandatory	120	5
(xxv)	Manufacture “V” bending tool & test.	Mandatory	80	5
(xxvi)	Construct a draw tool (single stage) and test to verify the component.	Mandatory	120	5
<b>Generic Learning Outcomes</b>				
(xxvii)	Recognize & comply safe working practices, environment regulation and housekeeping.	Mandatory	10	4
(xxviii)	Understand and explain different	Mandatory	170	4

	mathematical calculation & science in the field of study including basic electrical. [Different mathematical calculation & science -Work, Power & Energy, Algebra, Geometry & Mensuration, Trigonometry, Heat & Temperature, Levers & Simple machine, graph, Statistics, Centre of gravity, Power transmission, Pressure]			
(xxix)	Interpret specifications, different engineering drawing and apply for different application in the field of work. [Different engineering drawing-Geometrical construction, Dimensioning, Layout, Method of representation, Symbol, scales, Different Projections, Machined components & different thread forms, Assembly drawing, Sectional views, Estimation of material, Electrical & electronic symbol]	Mandatory	255	5
(xxx)	Select and ascertain measuring instrument and measure dimension of components and record data.	Mandatory	20	5
(xxxix)	Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity & quality.	Mandatory	25	4
(xxxixii)	Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	Mandatory	15	4
(xxxixiii)	Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	Mandatory	55	4
(xxxixiv)	Plan and organize the work related to the occupation	Mandatory	35	5
(xxxixv)	Interpret specifications, different Dies & Moulds design drawing and apply for different application in the field of work. [Different Tool Design Drawing-Hand injection moulds, Mould base, two cavity injection mould in different constructional featured,]	Mandatory	25	5

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

Please attach any document giving further detail about the structure of the qualification – eg a Curriculum Document or a Qualification Pack.

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

**SECTION 1**  
**ASSESSMENT**

**Body/Bodies which will carry out assessment:**

National Council for Vocational Training (NCVT)

**How will RPL assessment be managed and who will carry it out?**

1. At present the students who have passed 10th class with minimum 3 years' experience can appear for NCVT theory and practical semester examination directly.
2. The students who have passed SCVT examination in 'Tool & Die Maker (Press Tools, Jigs & Fixtures)' trade can also appear for the NCVT Examination in the relevant semester and Trade directly. NCVT will carry out the assessment and State Directorates advertise in newspapers for informing the prospective candidates.

**Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.**

**(1) Assessment process:**

The assessment for the semester-based qualification is carried out by conducting formative assessments, and end-of-semester examinations. The internal assessments for theory subjects and practical are conducted by the concerned instructors for evaluating the knowledge and skill acquired by trainees and the behavioural transformation of the trainees. This internal assessment is primarily carried out by collecting evidence of competence gained by the trainees by evaluating them at work based on assessment criteria, asking questions and initiating formative discussions to assess understanding and by evaluating records and reports, and sessional marks are awarded to them. Theory and practical examinations are conducted in Trade theory, Workshop Calculation & Science, Engineering Drawing and Employability Skills. The question papers for the theory Examinations contain objective type questions. Trade practical examinations are conducted by the respective State Governments. However, the question papers for the Trade practical are prepared by NCVT.

The marking pattern and distribution of marks for the qualification are as under:

Marking Pattern		
Sl. No.	Subject for the trade test	Maximum marks for the each subject
a)	Practical	300
b)	Trade Theory	200 Objective type Written test of 200 marks (Trade Theory 150 marks & Employability Skills 50 marks)
c)	Employability Skills	
d)	Work shop Calculation and Science.	100



e)	Engineering Drawing	Objective Type Written test of 100 marks (Engineering Drawing 50 marks & Work shop Calculation and Science 50 marks)
f)	Internal assessment	100
<b>TOTAL:</b>		700

**(2) Minimum pass marks:**

40% for each Theory Examination and 25% for each part/section of the Examination separately, and 60% marks for each Trade practical Examination.

**(3) Testing and certifications for the course:**

- OMR sheet based question paper.
- A panel of expert paper setters, who are graduates in the concerned field with minimum 5-7 years experience, is prepared for setting question papers for the Trade. The panel is vetted by the Member Secretary, NCVT.
- Paper setters are appointed from the panel after the approval of the competent authority for setting the question paper.
- The question papers are then moderated by the Board of Moderation to see if the paper is set as per the requirement and syllabus.
- The manuscripts of the moderated question papers are sent to Government Printing Presses for printing.
- Printed question papers, packed in sealed covers, are despatched to Banks/Police Stations for keeping in safe custody.
- The question papers are handed over to the Chairman/Principal of the Testing Centre two hours before the commencement of the Examination.
- An Examination Board consisting of representatives of industry/Employer/State Government are set up to supervise and monitor the conduct of Examinations at every Centre.
- Theory and practical Examinations are carried out with invigilators/examiners with the overall supervision of the Examination Board.
- Examiners called for evaluation of practical should have minimum technical qualification of a Diploma in the respective engineering field. However, when diploma holders not available, the qualification is suitably relaxed.
- Examiners for practical Examinations are appointed preferably from Polytechnics/ Engineering colleges/ Industry of repute/ Government Departments or from amongst retired qualified personnel possessing requisite qualifications and sufficient experience in the trade/discipline.
- Each State Directorate prepares a panel of Examiners according to the norms as mentioned above and the Examiners are appointed from the panel.
- Flying squads from State Governments as well as the Central Government are constituted to check malpractices during the conduct of Examinations.
- OMR based answer sheets are evaluated by the third party evaluator only. Third party evaluator is selected for three years by open bidding process.
- Evaluation of every practical examination is carried out by the concerned examiner (from industry/ polytechnics) with the overall supervision of the Examination Board in a free and fair manner as per the assessment criteria.
- Till 2014, the marks were compiled by the State Governments as per NCVT guidelines and the results were declared by the State Governments. At present, the marks are compiled by NCVT on

its portal [www.ncvtmis.gov.in](http://www.ncvtmis.gov.in) and the results are declared by the State Governments.

- The successful trainees are awarded National Trade Certificates.

**Overall assessment strategy:**

Assessment of the qualification evaluates trainees to show that they can integrate knowledge, skills and values for carrying out relevant tasks as per the defined assessable outcomes and assessment criteria. The trainees may choose the preferred language for assessment. The underlying principle of assessment is fairness and transparency. While assessing the trainee, assessor is directed to assess as per the defined assessment criteria against the assessable outcomes. The evidence of the competence acquired by the trainees can be obtained by conducting theory and practical examinations, observing the trainees at work, asking questions and initiating formative discussions to assess understanding and evaluating records and reports. The ultimate objective of the assessment is to assess the candidates as per the defined assessment criteria for the assessable/ learning outcomes.

**Specific Arrangements for assessment:**

- Assessment is outcome-based.
- There are formative and summative assessments in Theory and Practical.
- Assessment is carried out in Trade theory, Trade Practical, Workshop Calculation and Science, Engineering Drawing and Employability Skills.
- While Trade Theory and Trade Practical are used for assessing Trade-related jobs, Workshop Calculation and Science is used to test trainee's numerical skills, Drawing is used to test the ability of the trainee to draw and read sketches and Employability skills is used to test the communication and language skills of the trainee.
- In addition to demonstration of theory and practical knowledge, trainees get a chance to present total personality.

**Quality assurance activities:**

- Question papers are set by external paper setters
- Evaluation of Theory Examinations is done by third-party agency. Third party evaluator is selected for three years by open bidding process.
- Trade Practical is examined by External Examiner (as explained above).

Please attach any documents giving further information about assessment and/or RPL.

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

**ASSESSMENT EVIDENCE**

**Complete a grid for each component as listed in "Formal structure of the the qualification" in the Summary.**

*NOTE: this grid can be replaced by any part of the qualification documentation which shows the same information – ie Learning Outcomes to be assessed, assessment criteria and the means of assessment.*

**Title of Component:** Tool & Die Maker ( Press Tools, Jigs & Fixtures)

**Generic Assessable Outcome:**

<b>GENERIC LEARNING/ ASSESSABLE OUTCOME</b>	
<b>LEARNING/ ASSESSABLE OUTCOMES</b>	<b>ASSESSMENT CRITERIA</b>
1. Recognize & comply with safe working practices, environment regulation and housekeeping.	1. 1. Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements.
	1. 2. Recognize and report all unsafe situations according to site policy.
	1. 3. Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	1. 4. Identify, handle and store/ dispose of dangerous/unsalvageable goods and substances according to site policy and procedures following safety regulations and requirements.
	1. 5. Identify and observe site policies and procedures in regard to illness or accident.
	1. 6. Identify safety alarms accurately.
	1. 7. Report supervisor/ Competent authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	1. 8. Identify and observe site evacuation procedures according to site policy.
	1. 9. Identify Personal Productive Equipment (PPE) and use the same as per related working environment.
	1. 10. Identify basic first aid and use them under different circumstances.
	1. 11. Identify different fire extinguisher and use the same as per requirement.
	1. 12. Identify environmental pollution and contribute to avoidance of same.
	1. 13. Take opportunities to use energy and materials in an environmentally friendly manner.
	1. 14. Avoid waste and dispose waste as per procedure.
	1. 15. Recognize different components of 5S and apply the same in the working environment.
2. Understand, explain different mathematical calculation & science in the field of study including basic electrical and apply	2.1 Explain concept of basic science related to the field such as Material science, Mass, weight, density, speed, velocity, heat & temperature, force, motion, pressure, heat treatment, centre of gravity, friction.
	2.2 Measure dimensions as per drawing.

<p>in day-to-day work. <i>[Different mathematical calculation &amp; science-Work, Power &amp; Energy, Algebra, Geometry &amp; Mensuration, Trigonometry, Heat &amp; Temperature, Levers &amp; Simple machine, graph, Statistics, Centre of gravity, Power transmission, Pressure]</i></p>	2.3 Use scale/ tapes to measure for fitting to specification.
	2.4 Comply with given tolerance.
	2.5 Prepare list of appropriate materials by interpreting detail drawings and determine quantities of such materials.
	2.6 Ensure dimensional accuracy of assembly by using different instruments/gauges.
	2.7 Explain basic electricity, insulation & earthing.
<p>3. Interpret specifications, different engineering drawing and apply for different application in the field of work. <i>[Different engineering drawing- Geometrical construction, Dimensioning, Layout, Method of representation, Symbol, scales, Different Projections, Machined components &amp; different thread forms, Assembly drawing, Sectional views, Estimation of material]</i></p>	3.1 Read & interpret the information on drawings and apply in executing practical work.
	3.2 Read & analyse the specification to ascertain the material requirement, tools, and machining/assembly/maintenance parameters.
	3.3 Encounter drawings with missing/unspecified key information and make own calculations to fill in missing dimension/parameters to carry out the work.
<p>4. Select and ascertain measuring instrument and measure dimension of components and record data.</p>	4.1 Select appropriate measuring instruments such as micrometers, vernier calipers, dial gauge, bevel protector and height gauge (as per tool list).
	4.2 Ascertain the functionality & correctness of the instrument.
	4.3 Measure dimension of the components & record data to analyse with the given drawing/measurement.
<p>5. Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day-to-day work to improve productivity &amp; quality.</p>	5.1 Explain the concept of productivity and quality tools and apply during execution of job.
	5.2 Understand the basic concept of labour welfare legislation and adhere to responsibilities and remain sensitive towards such laws.
	5.3 Knows benefits guaranteed under various acts.
<p>6. Explain energy conservation, global warming and pollution and contribute in day-to-day</p>	6.1 Explain the concept of energy conservation, global warming, pollution and utilize the available resources optimally & remain sensitive to avoid environment pollution.

work by optimally using available resources.	
	6.2 Dispose waste following standard procedure.
7. Explain personnel finance, entrepreneurship and manage/organize related task in day-to-day work for personal & societal growth.	7.1 Explain personnel finance and entrepreneurship.
	7.2 Explain role of various schemes and institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non-financing support agencies to familiarize with the Policies/Programmes, procedure and the available scheme.
	7.3 Prepare project report to become an entrepreneur for submission to financial institutions.
8. Plan and organize the work related to the occupation.	8.1 Use documents, drawings and recognize hazards in the work site.
	8.2 Plan workplace/ assembly location with due consideration to operational stipulation.
	8.3 Communicate effectively with others and plan project tasks.
	8.4 Assign roles and responsibilities of the co-trainees for execution of the task effectively and monitor the same.
9. Interpret specifications, different Dies & Moulds design drawing and apply for different application in the field of work. [Different Tool Design Drawing- Hand injection moulds, Mould base, two cavity injection mould in different constructional feature]	9.1 Identify a single cavity Injection Mould.
	9.2 Identify different types of Mould Base.
	9.3 Identify the different parts of an Injection Mould.
	9.4 Explain the constructional features of an Injection Mould.
	9.5 Explain the method of designing an Injection Mould.

**Specific Assessable Outcomes:**

<b>SPECIFIC LEARNING/ ASSESSABLE OUTCOME</b>	
<b>Semester-I</b>	
<b>LEARNING/ ASSESSABLE OUTCOMES</b>	<b>ASSESSMENT CRITERIA</b>
10. Plan and organize the work to make job as per specification applying different types of basic fitting operation and check for dimensional	10.1 Plan & Identify tools, instruments and equipments for marking and make this available for use in a timely manner.
	10.2 Select raw material and visual inspect for defects.
	10.3 Mark as per specification applying desired mathematical calculation and observing standard procedure.

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) –

REVISED

<p>accuracy. [Basic fitting operation – Filing, Marking, Hack sawing, Drilling, Taping, chipping and Grinding etc. Accuracy: <math>\pm 0.1\text{mm}</math>]</p>	10.4 Measure all dimensions in accordance with standard specifications and tolerances.
	10.5 Identify Hand Tools for different fitting operations and make these available for use in a timely manner.
	10.6 Prepare the job for Hack-sawing, chiselling, filing, drilling, tapping, grinding.
	10.7 Perform basic fitting operations viz., Hack-sawing, filing, drilling, tapping and grinding to close tolerance as per specification to make the job.
	10.8 Observe safety procedure during above operation as per standard norms and company guidelines.
	10.9 Check for dimensional accuracy as per standard procedure.
	10.10 Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
<p>11. Make different fit of components for assembling as per required tolerance observing principle of interchangeability and check for functionality. [Different Fit –Open, Angular, &amp; Square Fit; Required tolerance: <math>\pm 0.05\text{ mm}</math>, angular tolerance: 1 degree]</p>	11.1 Plan and organize for fitting job.
	11.2 Select raw material, tools & equipments.
	11.3 Perform the work pieces for fitting according to tolerances and interchangeability.
	11.4 Check all dimensions and interchangeability in accordance with drawing and rectify, if required.
<p>12. Set different shaped jobs on different chuck and demonstrate conventional lathe machine operation observing standard operation practice. [Different chucks:3 jaws &amp; 4 jaws, different shaped jobs: round, square, hexagonal]</p>	12.1 Identify and acquaint with lathe machine operation with its components.
	12.2 Identify different work holding devices and acquaint with functional application of each device.
	12.3 Mount the appropriate work holding device and check for its functional usage to perform turning operations.
	12.4 Set the job on chuck as per shape.
	12.5 Set the lathe on appropriate speed & feed.
	12.6 Operate the lathe to demonstrate lathe operation, observing standard operating practice.
	12.7 Observe safety procedure during above operation as per standard norms and company guidelines.
<p>13. Prepare different cutting tool to produce jobs to appropriate accuracy by performing different turning operations.</p>	13.1 Identify cutting tool materials used on lathe machine as per the specification and their application.
	13.2 Plan and Grind cutting tools.
	13.3 Measure the tool angles with gauge and Bevel protractor

<p><i>[Different cutting tool – V tool, side cutting, parting, thread cutting (both LH &amp; RH), Appropriate accuracy: - ±0.06mm, Different turning operation – Plain turning, facing, drilling, boring (counter &amp; stepped), grooving, Parallel Turning, Step Turning, parting, chamfering, U - cut, Reaming, internal recess, knurling.</i></p>	as per tool signature.
	13.4 Mount the job and set machine parameter.
	13.5 Perform turning operations viz., facing, Parallel Turning, Step Turning, chamfering, grooving, U-cut, parting, drilling, boring(counter & stepped),Reaming, internal recess and knurling to make component as per specification.
	13.6 Check accuracy/ correctness of job using appropriate gauge and measuring instruments for their functional requirement.
	13.7 Avoid waste, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
<p>14. Set the different machining parameters to produce threaded components applying method/ technique and test for proper assembly of the components with an accuracy of ± 0.05 mm. <i>[Different threads viz., metric/ BSW/ Square]</i></p>	14.1 Plan and select appropriate method to produce threaded components.
	14.2 Plan and prepare thread cutting tool in compliance with standard thread parameters.
	14.3 Produce components as per drawing.
	14.4 Check accuracy/ correctness of job using appropriate gauge and measuring instruments for their functional requirement and suit to male/female part.
	14.5 Test the proper assembly of the threaded components.
<b>Semester-II</b>	
<p>15. Set the different machining parameters and cutters to prepare job by performing different milling operation and indexing. <i>[Different machining parameters – feed, speed and depth of cut. Different milling operations – plain, stepped, angular, dovetail, T-slot, contour, gear milling]</i></p>	5.1 Identify different work and tool holding devices and acquaint with functional application of each device.
	5.2 Mount the work and tool holding devices with required alignment and check for its functional usage to perform milling operations.
	5.3 Observe safety procedure during mounting as per standard norms.
	5.4 Solve problem by applying desired mathematical skill, basic methods, tools, materials and collect and organize information during setting.
<p>16. Produce components of high accuracy by surface grinding operation. <i>[accuracy of +/- 0.02 mm]</i></p>	16.1 Plan and select appropriate method to produce the work piece as per drawing.
	16.2 Select appropriate tools, equipment and machine to produce the work piece as per drawing and make these available for use in a timely manner.
	16.3 Grind the cutting tool following standard operating

	practice.
	16.4 Set the job on grinding machine and grind the surfaces as per specification/drawing (parallel and stepped) following standard operating practice.
	16.5 Check the dimension of parallel and stepped job by precession instrument (micrometer).
	16.6 Observe safety precautions during operation during machining.
	16.7 Check for desired performance.
17. Produce components of high accuracy by cylindrical grinding operations. [accuracy of +/- 0.02mm.]	17.1 Set the machining parameter and produce the component applying technique/ machine.
	17.2 External parallel grinding on cylindrical grinding.
	17.3 Internal parallel grinding with cylindrical grinding machine using chuck/ collet.
	17.4 Step grinding in cylindrical grinding machine (external).
	17.5 Taper grinding on cylindrical grinding machine (external).
	17.6 Check the accuracy of the component using instruments.
18. Sharpen different cutter or multipoint cutting tool. [Different cutters – end mill cutter, side & face milling cutter, single angle cutter, Reamer]	18.1 Plan and set the cutter or multipoint cutting tool to the machine.
	18.2 Set the appropriate machine parameter.
	18.3 Sharpen the cutting tool observing standard operating procedure.
	18.4 Observe safety/ precautions during the sharpening of cutting tool.
19. Develop isometric drawing and solid modelling of mould using CAD & Pro-E.	19.1 Demonstrate the working principle of the software.
	19.2 Demonstrate simple drawing in computer using Auto CAD.
	19.3 Demonstrate to draw an assembly drawing in computer.
	19.4 Demonstrate to draw a simple hand injection mould.
	19.5 Demonstrate the working principle of the software.
	19.6 Demonstrate simple drawing in computer using Pro-E
	19.7 Demonstrate to draw a simple hand injection mould.
20. Set the welding plant with appropriate parameters & perform different welding operations. [Appropriate parameter- electrode size, voltage, current, position, travel speed, torch angle.]	20.1 Set the welding plant as per standard procedure and observing safety norms.
	20.2 Perform Gas welding & Arc welding/ MIG welding.
	20.3 Check the welded joint.



## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) –

REVISED

21 Manufacture of drill Jig and produce component on drill machine by using Jigs and check for correctness. (Simple template & Plate Jig)	21. 1	Plan and select appropriate method to produce the drill jig as per drawing.
	21. 2	Select appropriate tools, equipment and machine to produce the drill jig as per drawing and make these available for use in a timely manner.
	21. 3	Construct the drill jig following standard operating practice.
	21. 4	Set the drill jig in appropriate machine and test observing standard operating practice.
	21. 5	Observe safety precautions during operation of machine.
	21. 6	Check for desired performance and dimension of the component.
22 Manufacture of Fixture (milling, turning and grinding) & test	22.1	Plan and select appropriate method to produce the fixture as per drawing.
	22.2	Select appropriate tools, equipment and machine to produce the fixture as per drawing and make these available for use in a timely manner.
	22.3	Construct the fixture following standard operating practice.
	22.4	Set the fixture in appropriate machine and test by observing standard operating practice.
	22.5	Observe safety precautions during operation per during machine.
	22.6	Check for desired performance and dimension of the component.
23. Set (both job and tool) CNC turningcentre and produce components as per drawing by preparing part programme.	23.1	Plan and prepare part programme as per drawing, simulate for its correctness with appropriate software.
	23.2	Prepare tooling layout and select tools as required.
	23.3	Demonstrate possible solution within the team.
	23.4	Set selected tools on to the machine.
	23.5	Test/Dry run the part programme on the machine.
	23.6	Set up the job and machine the component as per standard operating procedure involving parallel, step, taper, drilling, boring, radius, grooving and threading operations, etc.
	23.7	Check accuracy/ correctness of job using appropriate gauge and measuring instruments.
	23.8	Observe safety/ precaution during machining.
	23.9	Avoid wastage, ascertain unused materials and components for disposal, store these in an environmentally appropriate manner and prepare for disposal.
24. Set (both job and tool) CNC machining centre vertical and produce components	24. 1.	Plan and prepare part programme as per drawing applying range of cognitive and practical skills, simulate for its correctness with simulation software.

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) –

REVISED

as per drawing by preparing part programme.	24. 2. Demonstrate possible solutions within the team.
	24. 3. Prepare tooling layout and select tools as required.
	24. 4. Set selected tools on to the machine.
	24. 5. Test/Dry run the part programme on the machine.
	24. 6. Set up the job and produce the component as per standard operating procedure involving face milling, contour milling with tool radius compensation, pocket milling, drilling, peck drilling, countersinking, tapping operations using canned cycle for hole operations.
	24. 7. Solve problems during operation by selecting and applying basic methods, tools, materials and information and using quality concept.
	24. 8. Check accuracy/ correctness of job using appropriate gauge and measuring instruments.
	24. 9. Observe safety/ precaution during machining.
25 Perform 2D & 3D machining with CAM software.	25. 1. Prepare contour and profile machining.
	25. 2. Perform 2D & 3D machining.
	25. 3. Check the result for correctness.
26 Produce components using Electric Discharge machine (EDM) and Wire EDM as per drawing by preparing part programme with accuracy of $\pm 0.02\text{mm}$ .	26.1 Understand the parts and working principle of EDM.
	26.2 Demonstrate simple EDM operations.
	26.3 Understand the parts and working principle of Wire EDM.
	26.4 Demonstrate simple Wire EDM operations.
	26.5 Check for desired functionality.
27. Manufacture of blanking (simple) die set for square/ round/ rectangular/elliptical component and verify the component.	27. 1 Plan and select appropriate method to produce the blanking tool as per drawing.
	27. 2 Select appropriate tools, equipment and machine to produce the blanking tool as per drawing and make these available for use in a timely manner.
	27. 3 Construct the blanking tool following standard operating practice.
	27. 4 Set the blanking tool in appropriate press and test observing standard operating practice.
	27. 5 Observe safety precautions during operation on the machine.
	27. 6 Check for desired performance and dimension of the component.
28. Construct a Piercing & Blanking tool & test and verify the component.	28. 1 Plan and select appropriate method to produce the piercing & blanking tool as per drawing.
	28. 2 Select appropriate tools, equipment and machine to produce the piercing & blanking tool as per drawing and make these available for use in a timely manner.
	28. 3 Construct the piercing & blanking tool following standard operating practice.
	28. 4 Set the piercing & blanking tool in appropriate

	machine and test observing standard operating practice.
	28. 5 Observe safety precautions during operation on the machine.
	28. 6 Check for desired performance and dimension of the component.
<b>Semester – IV</b>	
29. Construct circuit of pneumatics and hydraulics observing standard operating procedure & safety aspect.	29. 1. Select and ascertain tools for the job and make this available for use in a timely manner.
	29. 2. Plan to construct pneumatics & hydraulics circuit as per drawing and collecting necessary information.
	29. 3. Demonstrate possible solutions and agree tasks within the team for constructing circuit.
	29. 4. Construct circuit of pneumatics and hydraulics observing standard procedure.
	29. 5. Comply with safety rules when performing the above operations.
	29. 6. Check different parameters and functionality of the system.
30. Demonstrate function of basic electrical circuit and sensors.	25.1 Demonstrate the measure of current, voltage and resistance using simple Ohm's law circuit.
	25.2 Demonstrate soldering techniques.
	25.3 Demonstrate step up and step-down transformers.
	25.4 Demonstrate working of Motors and generators.
	25.5 Demonstrate the Behaviour of Proximity Sensors and ultra-sonic sensors and logic operation of sensors.
	25.6 Limits and level control using sensors.
	25.7 Interfacing of sensors with electrical actuators.
31. Construct a Compound Tool & test and verify the component.	31.1 Plan and select appropriate method to produce the Compound Tool as per drawing.
	31.2 Select appropriate tools, equipment and machine to produce the Compound Tool as per drawing and make these available for use in a timely manner.
	31.3 Construct the Compound Tool following standard operating practice.
	31.4 Demonstrate the assembly of a Compound Tool and set the Compound Tool in appropriate machine and test observing standard operating practice.
	31.5 Observe safety precautions during operation per during machine.
	31.6 Measure with instruments/gauges as per drawing after stamping.
32. Construct a Progressive tool & test and verify the component.	32. 1. Plan and select appropriate method to produce the Progressive tool as per drawing.
	32. 2. Select appropriate tools, equipment and machine to produce the Progressive tool as per drawing and

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) –

REVISED

	make these available for use in a timely manner.
	32. 3. Construct the Progressive tool following standard operating practice.
	32. 4. Demonstrate the assembly of a Progressive tool and set the Progressive tool in appropriate machine and test observing standard operating practice.
	32. 5. Observe safety precautions during operation on all machines.
	32. 6. Measure with instruments/gauges as per drawing after stamping.
33. Plan and perform simple repair, overhauling of different machines and check for functionality. <i>[Different Machines – Drilling Machine, milling machine and Lathe]</i>	29.1 Ascertain and select tools and materials for the repair, overhauling and make this available for use in a timely manner.
	29.2 Plan work in compliance with standard safety norms.
	29.3 Demonstrate possible solutions and agree tasks within the team.
	29.4 Select specific parts to be repaired and ascertain for appropriate material and estimated time.
	29.5 Repair, overhaul and assemble the parts in the machine with the help of blue print.
	29.6 Check for functionality of part and ascertain faults of the part/ machine in case of improper function.
	29.7 Rectify faults of assembly.
34. Manufacture “V” bending tool & test.	34.1 Plan and select appropriate method to produce the “V” bending tool as per drawing.
	34.2 Select appropriate tools, equipment and machine to produce the draw “V” bending tool as per drawing and make these available for use in a timely manner.
	34.3 Construct the “V” bending tool following standard operating practice.
	34.4 Demonstrate the assembly of a “V” bending tool and set the “V” bending tool in appropriate machine and test observing standard operating practice.
	34.5 Observe safety precautions during operation of the machine.
	34.6 Measure with instruments/gauges as per design after “V” bending.
35. Construct a draw tool (single stage) and test to verify the component.	35.1 Plan and select appropriate method to produce the draw tool as per drawing.
	35.2 Select appropriate tools, equipment and machine to produce the draw tool as per drawing and make these available for use in a timely manner.
	35.3 Construct the draw tool following standard operating practice.
	35.4 Demonstrate the assembly of a draw tool and set the

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) –

REVISED

	draw tool in appropriate machine and test by observing standard operating practice.
	35.5 Observe safety precautions during operation on the machine.
	35.6 Measure with instruments/gauges as per design after drawing.

#### Means of assessment 1

Assessment will be evidence based comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

#### Means of assessment 2

#### Pass/Fail

The minimum pass percentage is 40% for each Theory Examination and 25% for each part/section of the Examination separately, and 60% marks for each Trade practical Examination.

**NSQF QUALIFICATION FILE**

Tool & Die Maker (Press Tools, Jigs & Fixtures) –  
REVISED

**SECTION 2**  
**EVIDENCE OF LEVEL**

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

#### OPTION A

Title/Name of qualification/component: Tool & Die Maker ( Press Tools, Jigs & Fixtures)			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
Process	<p><b>Requires Well Developed Skill</b></p> <ul style="list-style-type: none"> <li>Plan and organize the work to make job as per specification applying different types of basic fitting operation and check for dimensional accuracy.</li> <li>Make different fit of components for assembling as per required tolerance observing principle of interchangeability and check for functionality.</li> <li>Prepare different cutting tool to produce jobs to appropriate accuracy by performing different turning operations. Produce components of high accuracy by surface grinding operation.</li> <li>Produce components of high accuracy by cylindrical grinding operations.</li> </ul> <p><b>Clear choice of procedures in familiar context</b></p> <ul style="list-style-type: none"> <li>Plan and organize the work to make job as per specification applying different types of basic fitting operation and check for dimensional accuracy. [Basic fitting operation – Filing, Marking, Hack sawing, Drilling, Taping, chipping and Grinding etc</li> <li>Make different fit of components for assembling as per required tolerance observing principle of</li> </ul>	<p>The learner requires to demonstrate a well-developed skill for example, measurement as per required accuracy, make different components and fitting, as indicated in the learning outcomes to achieve the tolerance levels and accuracy demanded as per the job.</p> <p>Hence NSQF Level is 5 for this descriptor</p> <p>The learner requires to apply clear choice of procedures in familiar context as indicated in the learning outcomes like “Plan and organize the work to make job as per specification applying different types of basic fitting operation and check for dimensional accuracy, Perform 2D &amp; 3D machining with CAM software, Manufacturing of</p>	5

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

Title/Name of qualification/component: Tool & Die Maker ( Press Tools, Jigs & Fixtures)			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<p>interchangeability and check for functionality.</p> <ul style="list-style-type: none"> <li>• Develop isometric drawing and solid modelling of mould using CAD &amp; Pro-E.</li> <li>• Manufacturing of drill Jig and produce component on drill machine by using Jigs and check for correctness. (Simple template &amp; Plate Jig)</li> <li>• Manufacturing of fixtures (milling, turning and grinding) &amp; test.</li> <li>• Set (both job and tool) CNC turning centre and produce components as per drawing by preparing part programme.</li> <li>• Set (both job and tool) CNC machining centre vertical and produce components as per drawing by preparing part programme.</li> <li>• Perform 2D &amp; 3D machining with CAM software.</li> <li>• Produce components using Electric Discharge Machine (EDM) and Wire EDM as per drawing by preparing part programme with accuracy of <math>\pm 0.02\text{mm}</math>.</li> <li>• Manufacturing of blanking (simple) die set for square/ round/ rectangular/elliptical component and verify the component.</li> <li>• Construct a Piercing &amp; Blanking tool &amp; test and verify the component.</li> <li>• Construct circuit of pneumatics and hydraulics observing standard operating procedure and safety aspect.</li> </ul>	<p>fixtures (milling, turning and grinding) &amp; test , Construct a Compound Tool &amp; test and verify the component,</p> <p>Plan and perform simple repair, overhauling of different machines and check for functionality "In all these learning outcomes the learner has to apply ones knowledge and decide what needs to be done to identify a fault and decide how to rectify it or plan as per requirements and resources available.</p> <p>Hence NSQF Level is 5 for this descriptor</p>	



## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

Title/Name of qualification/component: Tool & Die Maker ( Press Tools, Jigs & Fixtures)			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<ul style="list-style-type: none"> <li>• Demonstrate function of basic electrical circuit and sensors.</li> <li>• Construct a Compound Tool &amp; test and verify the component.</li> <li>• Construct a Progressive tool &amp; test and verify the component.</li> <li>• Plan and perform simple repair, overhauling of different machines and check for functionality.</li> <li>• Manufacture “V” bending tool &amp; test.</li> <li>• Construct a draw tool (single stage) and test to verify the component.</li> </ul>		
Professional knowledge	<p><b>Knowledge of facts in a field of work or study</b></p> <ul style="list-style-type: none"> <li>• Trade tools specifications.</li> <li>• Machines and accessories,</li> <li>• Safety precautions to be observed in a workshop,</li> <li>• Commercial sizes and various types of metal sheets, coated sheets and their uses as per BIS specifications.</li> <li>• Various types of metal, their selection and application,</li> <li>• Heat treatment of metals,</li> <li>• Different standard systems of fits and limits.</li> <li>• Lathe specifications, and constructional features.</li> <li>• Milling Machine, specifications.</li> <li>• Grinding machine introduction, types.</li> <li>• Electrical discharge machine (EDM) introduction</li> </ul>	<p>The learner requires to demonstrate knowledge of facts, in a field of work or study which is Identification, Selection and Operation of Different Machining Processes, fitting, Heat Treatment, Safe Handling of Tools, Operation of Electronic Discharge Machine, Safe handling of tools, equipment &amp; CNC machines, CNC Mill with FANUC CNC CONTROL.</p> <p>Hence NSQF Level is 5 for this descriptor.</p>	5

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

Title/Name of qualification/component: Tool & Die Maker ( Press Tools, Jigs & Fixtures)		Level: 5	
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<p>principle of operation,</p> <ul style="list-style-type: none"> <li>• Injection moulding machines:</li> </ul> <p><b>Knowledge of Principles and general concepts in a field of work or study</b></p> <ul style="list-style-type: none"> <li>• Drilling machines-types and their application, ductility, malleability hardness, brittleness, toughness, tenacity, and elasticity</li> <li>• Introduction about metals, difference between Metal and Non Metal, properties of metal, Classification of metals and its applications,</li> <li>• Interchangeability: Necessity in Engg, field definition, BIS. Definition, types of limit, terminology of limits and fits-basic size, actual size, deviation, high and low limit, zero line, tolerance zone</li> <li>• Wrought iron- : properties and uses. Steel: plain carbon steels, types, properties and uses</li> <li>• the importance of keeping the work free from rust and corrosion.</li> <li>• Heat treatment of metals,</li> <li>• process- such as annealing, nit riding, hardening, tempering, case hardening, carburizing, cyaniding, flame hardening,</li> <li>• Induction hardening, purposes and its effects on</li> </ul>	<p>The learner requires to demonstrate the Knowledge of Principles and General Concepts in a Field of Work or Study which is Principles of Working and Operation of Drilling Machine, Different Metals and their Properties, Pascal’s Law, process- such as annealing, nit riding, hardening, tempering, case hardening, carburizing, cyaniding, flame hardening etc.</p> <p>Hence NSQF Level is 5 for this descriptor.</p>	

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

Title/Name of qualification/component: Tool & Die Maker ( Press Tools, Jigs & Fixtures)			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<p>the properties of steel.</p> <ul style="list-style-type: none"> <li>• Overview of an industrial hydraulic system, Applications, Pascal’s Law.</li> <li>• Explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity &amp; quality</li> <li>• Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources</li> </ul> <p><b>Knowledge of processes in a field of work or study</b></p> <ul style="list-style-type: none"> <li>• Various fitting procedures - marking, Hacksawing, Chiselling, Filing, Drilling, Taping and Grinding</li> <li>• Method of expressing tolerance as per BIS Fits: Definition, types, description of each with sketch. Vernier height gauge: material construction, parts, graduations (English &amp; Metric) uses, care and maintenance.</li> <li>• Methods of use, care and maintenance of various trade related tools and machines</li> <li>• Tool selection based on different requirements</li> <li>• General operations like turning, facing, parting-off, grooving, chamfering, boring etc.</li> <li>• Selection procedure of grinding wheels.</li> <li>• Calculation of cutting speed, feed, machining time</li> </ul>	<p>The learner requires to demonstrate the knowledge of Processes in a field of work or study which is Various fitting processes, Selection procedure of grinding wheels, Methods of use, care and maintenance of various trade related tools and machines.</p> <p>Hence NSQF Level is 5 for this descriptor.</p>	

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

Title/Name of qualification/component: Tool & Die Maker ( Press Tools, Jigs & Fixtures)			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<p>for milling machine. Milling machine operations.</p> <ul style="list-style-type: none"> <li>• Maintenance - Total productive maintenance, - Autonomous maintenance, Routine maintenance</li> <li>• Possible causes for assembly failures and remedies.</li> <li>• Principles of bending, plastic deformation due to bending, bending elements.</li> <li>• Classification of press, types of a press, parts of a press, press selection, strip feeding arrangement, die cushion.</li> </ul>		
Professional skill	<ul style="list-style-type: none"> <li>• Plan and organize the work to make job as per specification applying different types of basic fitting operation and Check for dimensional accuracy.</li> <li>• Make different fit of components for assembling as per required tolerance observing principle of interchange ability and check for functionality.</li> <li>• Set different shaped jobs on different chuck and demonstrate conventional lathe machine operation observing standard operation practice.</li> <li>• Prepare different cutting tool to produce jobs to appropriate accuracy by performing different turning operations Set the different machining parameters to produce threaded components applying method/ technique and test for proper assembly of the components</li> </ul>	<p>The learning outcomes listed below, like</p> <p>‘Produce components of high accuracy by surface grinding operation.’ and ‘Construct circuit of pneumatics and hydraulics, Manufacturing of fixtures (milling, turning and grinding) &amp; test, Manufacture “V” bending tool &amp; test, Construct a draw tool (single stage) and test to verify the component’</p> <p>requires cognitive and practical skills to accomplish tasks that involve understanding requirements; then as per requirements deciding which operations/procedure/tools will achieve desired result; planning the sequence of</p>	5

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

Title/Name of qualification/component: Tool & Die Maker ( Press Tools, Jigs & Fixtures)			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<ul style="list-style-type: none"> <li>• Produce components of high accuracy by surface grinding operation.</li> <li>• Produce components of high accuracy by cylindrical grinding operations.</li> <li>• Sharpen different cutter or multipoint cutting tool</li> <li>• Develop isometric drawing and solid modelling of mould using CAD &amp; Pro-E.</li> <li>• Manufacturing of drill Jig and produce component on drill machine by using Jigs and check for correctness. (Simple template &amp; Plate Jig)</li> <li>• Manufacturing of fixtures (milling, turning and grinding) &amp; test.</li> <li>• Set (both job and tool) CNC turning centre and produce components as per drawing by preparing part programme.</li> <li>• Set (both job and tool) CNC machining centre vertical and produce components as per drawing by preparing part programme.</li> <li>• Perform 2D &amp; 3D machining with CAM software.</li> <li>• Produce components using Electric Discharge Machine (EDM) and Wire EDM as per drawing by preparing part programme with accuracy of <math>\pm 0.02\text{mm}</math>.</li> <li>• Manufacturing of blanking (simple) die set for square/ round/ rectangular/elliptical component and verify the component.</li> <li>• Construct a Piercing &amp; Blanking tool &amp; test and verify the component.</li> </ul>	<p>operations to maximum effectiveness; constantly checking and reviewing plan, etc , all of which involve problem solving and decision making. Hence NSQF Level is 5 for this descriptor</p>	

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

Title/Name of qualification/component: Tool & Die Maker ( Press Tools, Jigs & Fixtures)			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<ul style="list-style-type: none"> <li>• Construct circuit of pneumatics and hydraulics observing standard operating procedure and safety aspect.</li> <li>• Demonstrate function of basic electrical circuit and sensors.</li> <li>• Construct a Compound Tool &amp; test and verify the component.</li> <li>• Construct a Progressive tool &amp; test and verify the component.</li> <li>• Plan and perform simple repair, overhauling of different machines and check for functionality.</li> <li>• Manufacture “V” bending tool &amp; test.</li> <li>• Construct a draw tool (single stage) and test to verify the component.</li> </ul>		
Core skill	<p><b>Desired Mathematical Skills</b></p> <ul style="list-style-type: none"> <li>• Measure dimensions as per drawing</li> <li>• Ensure dimensional accuracy of assembly by using different instruments/gauges.</li> <li>• Measure dimension of the components &amp; record data to analyse the with given drawing/measurement</li> <li>• Mark as per specification applying desired mathematical calculation and observing standard procedure.</li> <li>• Measure all dimensions in accordance with standard specifications and tolerances.</li> </ul>	<p>The learning outcomes for example ‘Measure dimensions as per drawing , Measure dimension of the components &amp; record data’ and ‘Mark as per specification, Measure all dimensions in accordance with standard specifications and tolerances’ displays the learning outcomes where the learner needs to display desired mathematical skill;</p> <p>The learning outcomes like “Conduct appropriate and target oriented discussions with higher authority and within the team, Resolve disputes within the team ” demonstrates understanding of social, political; and some skill of collecting and organising information,</p>	5

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

Title/Name of qualification/component: Tool & Die Maker ( Press Tools, Jigs & Fixtures)			Level: 5
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<p><b>Understanding of social/political</b></p> <ul style="list-style-type: none"> <li>Understand and explain the concept in productivity, quality tools, and labour welfare legislation and apply such in day to day work to improve productivity &amp; quality.</li> <li>Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.</li> <li>Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal &amp; societal growth.</li> </ul> <p><b>Organising information and communication</b></p> <p>Interpret &amp; use company and technical communication</p> <ul style="list-style-type: none"> <li>Conduct appropriate and target oriented discussions with higher authority and within the team.</li> <li>Present facts and circumstances, possible solutions &amp; use English special terminology.</li> <li>Resolve disputes within the team</li> <li>Conduct written communication.</li> </ul>	<p>communication.</p> <p>Hence NSQF Level is 5 for this descriptor</p>	
Responsibility	<ul style="list-style-type: none"> <li>Plan and organize the work to make job as per specification applying different types of basic fitting operation and Check for dimensional accuracy.</li> </ul>	<p>The role of Tool &amp; Die Maker ( Press Tools, Jigs &amp; Fixtures) is independently responsible to perform the work as per specifications followed by analysis of what needs to be</p>	4

## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

Title/Name of qualification/component: Tool & Die Maker ( Press Tools, Jigs & Fixtures)		Level: 5	
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<ul style="list-style-type: none"> <li>• Make different fit of components for assembling as per required tolerance observing principle of interchange ability and check for functionality.</li> <li>• Set different shaped jobs on different chuck and demonstrate conventional lathe machine operation observing standard operation practice.</li> <li>• Prepare different cutting tool to produce jobs to appropriate accuracy by performing different turning operations Set the different machining parameters to produce threaded components applying method/ technique and test for proper assembly of the components</li> <li>• Produce components of high accuracy by surface grinding operation.</li> <li>• Produce components of high accuracy by cylindrical grinding operations.</li> <li>• Sharpen different cutter or multipoint cutting tool</li> <li>• Develop isometric drawing and solid modelling of mould using CAD &amp; Pro-E.</li> <li>• Manufacturing of drill Jig and produce component on drill machine by using Jigs and check for correctness. (Simple template &amp; Plate Jig)</li> <li>• Manufacturing of fixtures (milling, turning and grinding) &amp; test.</li> <li>• Set (both job and tool) CNC turning centre and produce components as per drawing by preparing part programme.</li> <li>• Set (both job and tool) CNC machining centre</li> </ul>	<p>done based on their understanding of various fitting, machining, turning, mechanical working processes, principles and standards. This is indicated in all the learning outcomes.</p> <p>Hence NSQF Level is 4 for this descriptor</p>	



## NSQF QUALIFICATION FILE

### Tool & Die Maker (Press Tools, Jigs & Fixtures) – REVISED

Title/Name of qualification/component: Tool & Die Maker ( Press Tools, Jigs & Fixtures)		Level: 5	
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF level descriptors	NSQF Level
	<p>vertical and produce components as per drawing by preparing part programme.</p> <ul style="list-style-type: none"> <li>• Perform 2D &amp; 3D machining with CAM software.</li> <li>• Produce components using Electric Discharge Machine (EDM) and Wire EDM as per drawing by preparing part programme with accuracy of <math>\pm 0.02\text{mm}</math>.</li> <li>• Manufacturing of blanking (simple) die set for square/ round/ rectangular/elliptical component and verify the component.</li> <li>• Construct a Piercing &amp; Blanking tool &amp; test and verify the component.</li> <li>• Construct circuit of pneumatics and hydraulics observing standard operating procedure and safety aspect.</li> <li>• Demonstrate function of basic electrical circuit and sensors.</li> <li>• Construct a Compound Tool &amp; test and verify the component.</li> <li>• Construct a Progressive tool &amp; test and verify the component.</li> <li>• Plan and perform simple repair, overhauling of different machines and check for functionality.</li> <li>• Manufacture "V" bending tool &amp; test.</li> <li>• Construct a draw tool (single stage) and test to verify the component.</li> </ul>		

**SECTION 3  
EVIDENCE OF NEED****What evidence is there that the qualification is needed?**

The Tool & Die Maker (Press Tool & Jig , Fixtures) pass outs will be mainly absorbed as Tool maker and repairer of prototypes or special tools, Press Tools maker, Press Tools setter, Jigs & Fixtures maker, various types of mechanical devices maker, fabricator of various parts, fitter in industries of Production & Manufacturing, Automobile Manufacturing and Assembling sector, Industries engaged in Automation Processes.

The trade forms a part of the Recruitment Rules of major Public and Private Industries engaged in Production and Manufacturing, Automobiles and other Automation Related Processes.

Placement records from few ITIs are enclosed.

**What is the estimated uptake of this qualification and what is the basis of this estimate?**

The employment prospect for this qualification is very high. There is also high demand for starting the training programme on this trade amongst new institutes. As of now the total seating capacity of the training programme is 966 (including 30% supernumeraries) approximately in 58 ITIs.

**What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF?**

The qualification is a long term course of two years originally designed and approved by NCVT for the Craftsmen Training Scheme and is in existence for the last 60 years. NCVT has been entrusted with the responsibilities of prescribing standards and curricula for craftsmen training, advising the Government of India on the overall policy and programmes, conducting All India Trade Tests and awarding National Trade Certificates.

No existing course is available with same content and duration.

**What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?**

- Mentor Council (MC) for the Production and Manufacturing sector was formed in 2014 to review the curriculum of this qualification under the sector.
- CSTARI, the research wing of DGT, reviews and updates the qualification, in consultation with industries and other stakeholders, on a regular basis by conducting trade committee meetings.
- DGT will keep on doing continuous comparative study in the trade by referring to relevant upcoming qualifications in the National Qualifications Register (NQR) and relevant sectors.

Please attach any documents giving further information about any of the topics above.

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

**SECTION 4****EVIDENCE OF PROGRESSION**

**What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?**

- Qualifying trainee will obtain an NCVT Certificate in Tool & Die Maker ( Press Tools, Jigs & Fixtures) trade which gives the following options of progression to the trainee:
  - 1) Can appear in 10+2 examination through National Institute of Open Schooling (NIOS) for acquiring higher secondary certificate and can go further for General/ Technical education.
  - 2) Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC)
  - 3) Can join Crafts Instructor Training Scheme (CITS) in the relevant trade after which they will be employed in ITI/ Vocational Training Institute as instructor
  - 4) Can join as skilled worker in the relevant industry
  - 5) Can take Lateral entry to Diploma in Mechanical/ Production/ Industrial Engineering, as permitted by State Boards of Technical Education.
  - 6) can become supervisor after doing diploma in relevant branch of Engineering

Please attach any documents giving further information about any of the topics above.

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.